

CHAPTER 4. SUCCESS CRITERIA AND MONITORING PLAN

The MA will be monitored on a yearly basis beginning in 2002 to track the success of the implementation of the mitigation necessary to allow the filling of the Ridges Basin Reservoir and yearly through a 5 to 9 year period after the reservoir begins filling to evaluate full mitigation completion. The MA will also be monitored on a 3 to 5 year interval for the full life of the Project to ensure the continued success of the MA. The baseline conditions for vegetation were measured by Reclamation in 2002 using the methodologies described in Appendix F. Reference standards are described by Frontier Corporation in Appendix A.

4.1 Mitigation Success Criteria

The time frame for monitoring of mitigation success is divided into three different time periods. The first time period can be defined as the MA development period. During this period 95 percent of the wetland/riparian features will be completed. The second time period start at the initiation of filling of Ridges Basin Reservoir and continues for a periods of three to five years after reservoir filling. The third time period consists of the time remaining for the life of the project.

It is important to note that in the following sections there is a clear distinction between natural recovery areas and planted areas. Natural recovery areas are those areas containing enough native vegetation to quickly recover their potential habitat values (within 1-3 years) from the impacts of past land use practices or mitigation development activities. Planting areas (areas where planting will occur) are areas so severely impacted by either mitigation activities or past land use practices that they are not expected to recover their potential habitat values without supplemental planting or seeding to aid with native plant re-establishment. Under either condition, the resulting habitat values will be maintained for the life of the ALP Project.

4.1.1 Performance Criteria for 95 Percent Completion of Constructed Physical Features

As committed to in the 2000 ALP Project FSEIS, the completion of constructed physical features is defined as:

- § All lands to mitigate ALP wetland/riparian habitat loss will be acquired by Reclamation.
- § All of the MA will be adequately fenced to prevent livestock trespass and no livestock will be allowed to graze in the MA unless it is determined that it would be beneficial to the MA to periodically graze portions of the MA, such as to promote vigor or to control weeds.
- § All river restoration construction downstream of Long Hollow will be completed. The restored channel area will be monitored to ensure that channel stabilization is occurring and plantings are developing properly.

- § All river banks outside of the channel restoration segment within the MA will be monitored for natural recovery during the MA development period (the period prior to reservoir filling). If the greenline assessment fails to indicate self-stabilization as determined by Reclamation, artificial stabilization will be implemented. The restored channel area banks will likewise be monitored to ensure the constructed banks and plantings are functioning properly during this same period.
- § 100% of tamarisk and Russian olive trees will be removed from the tree and shrub canopies of the MA. It is Reclamation's goal to try to remove 100 % of all undesirable woody species from the MA despite age class, but this may not be practicable during the initial years of operation. Small sprouts of these undesirable species will continue to be treated and considered to be part of the ongoing herbaceous weed treatment program.
- § Implementation of herbaceous weed control program for the riparian area of the MA.
- Planting and re-seeding with desirable species will be accomplished for the riparian areas being restored. The planted areas will be monitored to ensure that they are developing properly. Some areas may need to be replanted (some more than one time) to achieve desired densities.

Vegetation establishment standards at the initiation of the filling of Ridges Basin Reservoir are listed below in Section 4.1.2 - Performance Criteria for Full Mitigation Success- Desired Vegetation Establishment Standards for the MA.

4.1.2 Performance Criteria for Full Mitigation Success

At the initiation of filling of Ridges Basin Reservoir, a monitoring period will commence which will be used to determine whether the mitigation measures have been successfully implemented. This period will last through Ridges Basin Reservoir filling (a period of 2 to 4 years depending on hydrology of the Animas River and safety of dam filling requirements) and a 3 to 5 year monitoring period after reservoir filling.

In this section the term canopy is used to describe three distinct vegetative layers: *tree canopy* (woody species, typically 3+ meters in height), *shrub canopy* (woody species, typically 1-3 meters in height) and *herbaceous canopy* (non-woody species, typically 0-1 meters in height). Canopy is quantified by percent areal (horizontal) coverage in each of these layers respectively.

The following success criteria will be used.

- All of the fencing is installed around the MA to prevent livestock trespass. Grazing will remain prohibited in the MA unless in the future Reclamation determines that it would be beneficial to the MA to have periodic controlled grazing on portions of the MA.

- Within the MA, all tamarisk and Russian olive trees will have been removed from the riparian forest-scrub/shrub (tree and shrub) canopies. The tamarisk and Russian olive shoots and re-sprouts within the herbaceous canopy layer (defined as less than 1 meter in height here) will be controlled by the implementation of an Integrated Vegetation Management (IVM) plan as discussed below.
- During this monitoring period belt transects (see Appendix F for procedure) will be used to monitor the vegetation in the MA. Data gathered by Reclamation using belt transects prior to initiation of MA development will be used as a reference of areal coverage of noxious weeds in the MA and as a reference to determine the level of weed control effectiveness and development of desired species over time. Reclamation will endeavor to reduce noxious weed coverage as much as is possible, but will reduce weed infestations to at least 10% areal coverage through the implementation of an IVM plan.
- Unless scoured by a natural flood event or other natural disaster, all weed-treated areas within the MA will be re-seeded with desirable herbaceous (native grass/forb mix) species where undesirable herbaceous species have been removed or herbaceous canopy cover has been reduced due to weed treatment activities. Some of the more disturbed areas may require additional spot and/or systematic plantings to ensure mitigation objectives (as described later in this section) of groundcover (herbaceous canopy) improvement are reached. Reclamation estimates that approximately 30 acres will need to be seeded with an appropriate native grass/forb mix to offset the groundcover lost by weed treatment. Groundcover loss and re-establishment will be monitored by the vegetation monitoring transects as described in Appendix F.
- All areas cleared of Russian olive and tamarisk will be revegetated with native vegetation, emphasizing native cottonwood and willow species. This will be accomplished by spot plantings and systematic plantings for more disturbed areas as described below.

4.1.2.1 Desired Vegetation Establishment Standards for the MA

Standards of plant establishment differ between planted areas and areas expected to recover through natural processes. The riparian forest and meadow reference standards developed for the ALP Project wetland/riparian mitigation were established to indicate health of the habitat in relationship to soil quality, moisture availability and topographic conditions as well as already established native plant life. Vegetation establishment mitigation objectives are therefore highly variable due to expected variable conditions, particularly with regard to depth to the groundwater table.

Riparian Woody Species Improvement Standards:

PLANTED AREAS: Reclamation intends to plant an estimated 15-20 acres of riparian forest. Planting objectives are as follows:

Cottonwood/Boxelder Planted: Cottonwood/Boxelder plantings, both species/both sexes in approximately equal sex ratios with a greater emphasis upon the cottonwood species, Rio Grande (*Populus deltoides*) and narrowleaf (*Populus angustifolia*). Lanceleaf (*P. lanceolata*) cottonwood (hybrid) is permissible as a substitute. About 3,000 total plants, divided approximately even between each sex of each species, will be planted. About half will be planted in the floodplain and half in the next terrace and above where appropriate, with 80% survival rate and a mean (average) height of 2 meters at time of reservoir filling with the resulting vegetation densities maintained for the life of the project. The plantings will occur on 20 foot (6 meter) centers or denser to one another or other woody species planted as part of the mitigation program or from other existing native trees or shrubs.

Willow Planted: Willow plantings on the active flood plain will primarily include Coyote willow (*Salix exigua*), peachleaf (*Salix amygdaloides*) and others, if found desirable. Other willow species planted will include those of cultural significance to the Ute Tribes of Colorado and appropriate to the region and site conditions for floodplain and first/second terrace plantings. About 2,000 total plants will be planted, with an 80% survival rate and a mean height of 1.5 meters at time of reservoir filling. Plantings will occur on 10 foot (3 meter) centers or denser to one another or other plantings.

Other Woody Planted: Other woody species planted will include those of cultural significance to the Ute Tribes of Colorado and appropriate to the region and site conditions for floodplain and first/second terrace plantings. These may include, but are not limited to, Chokecherry (*Prunus virginiana*), Three-leaf Sumac (*Rhus trilobata*), New Mexican Privet (*Foresteria neomexicana*), Buffaloberry (*Shepherdia argentea*), etc. A mixed total of at least 500 of these woody plants will be planted, where appropriate with an 80% survival rate and a mean height of 1 meter (due to slower growth rates than willows) at time of reservoir filling with the resulting vegetation densities maintained for the life of the project. Plantings will occur on 10 foot (3 meter) centers or denser to one another or other woody species plantings or existing native woody vegetation.

NATURAL RECOVERY AREAS: Riparian desirable woody plant densities are not likely to increase dramatically in the short term from the removal of grazing and weed control but an across the board increase (as measured in monitoring transects and plots) is expected to be achieved by the time of reservoir filling (density of current native woody species as measured by transect or by reference plots within the riparian habitat only). In riparian buffer zones, woody vegetation grows less vigorously and is subject to more severe weed incursions than the moister 'true riparian' areas. Therefore, a general increase of desirable woody vegetation is expected to occur naturally in this zone by the

time of the ALP Project reservoir filling, but less than that which will develop proximate to the river.

According to the established reference standards, all 3.6 acres currently defined as being RFS-H-Type 1 (high functioning riparian forest complex) will remain high functioning, whereas the current 70.2 acres of RFS-M-Type 2 (mid-range functional riparian forest complex) will show improvements. The relative improvement per specific habitat patch will vary according to the site specific conditions and only 30 acres of this current habitat category will improve into the high functioning condition, while the remaining 40.2 acres will be in a higher functioning but still mid-range category of overall riparian forest condition. For the 66.9 acres of RFS-L-Type 3 (low functional riparian forest complex) 10 acres are expected to improve to high functioning condition while another 40 acres will be improved to the mid-range functioning condition. The remaining 6.9 acres will be improved, but will likely remain categorized as low functioning condition due to site specific limitations.

Riparian Herbaceous Layer (Meadow) Improvement Standards:

PLANTED AREAS: Where riparian meadow layer planting occurs, as determined by Reclamation, a mean minimum 50% ground cover will be achieved and a mean desirable plant height of at least 20 cm will be achieved by the time of reservoir filling. Planted species composition will be coordinated with CDOW, the Service and the Colorado Ute Tribes.

Plants to be included in wet meadow plantings include but are not limited to western wheatgrass (*Agropyron smitii*), green needlegrass (*Stipa viridula*), switchgrass (*Panicum virgatum*), Nebraska sedge (*Carex nebraskensis*) and woolly sedge (*Carex lanuginose*).

NATURAL RECOVERY AREAS: Herbaceous vegetation is expected to increase in density as well as height. Measured mean density and desirable plant heights (as determined by Reclamation) will exceed a 20% increase across the board for the herbaceous layers where soil and moisture conditions allow. Where conditions will not allow, as determined by soil type and the site specific depth to water table, a natural recovery of increased density and height of at least 10% will be achieved in the herbaceous layer.

According to the established reference standards, all 2.9 acres currently defined as RM-H-Type 1 (high functioning riparian meadow) will remain high functioning, whereas the current 36.9 acres of RM-M-Type 2 (mid-range functional riparian meadow) shall all show improvement, but the relative improvement per specific habitat patch will vary according to the site specific conditions and only 20 acres of this current habitat category will improve into the high functioning condition, while the remaining 16.9 acres will be in a higher functioning but still mid-range category of overall riparian meadow condition. For the 37.2 acres of RFM-L-Type 3 (low functional riparian meadow) 10 acres are

expected to improve to high functioning condition while another 20 acres will be improved to the mid-range functioning condition. The remaining 7.2 acres will be improved, but will remain categorized as low functioning condition due to site specific limitations.

Buffer area herbaceous layer improvement standards:

PLANTED AREAS: In buffer areas planted, a mean of 30% ground cover in desirable species and minimum of 10 cm mean desirable plant height in the herbaceous layer will be achieved unless unforeseen site specific conditions limit plant establishment. No specific mitigation objectives in acres are tied to this planting feature as seasonal moisture conditions and soils will dictate the potential success of vegetation establishment, however an estimated 20 acres are expected to be planted prior to reservoir filling. Weeds in buffer areas shall be controlled to the same specifications as the truly riparian forest and meadow areas described above. Weed coverage in these areas shall remain less than 10% of the total ground cover.

NATURAL RECOVERY AREAS: In dryer conditions and with poorer soils in this semi-desert region, natural recovery of the herbaceous layer will be slower. A mean increase of desirable herbaceous density will be achieved. Mean plant height may be unaffected. Weeds in buffer areas shall be controlled to the same specifications as the truly riparian forest and meadow areas described above. Weed coverage in these areas shall remain less than 10% of the total ground cover.

4.2 Monitoring Methods and Reporting

4.2.1 Physical Features

The condition of the livestock enclosure fencing will be monitored and maintained on a routine basis. Monitoring will occur at least on a monthly basis and generally more often. Livestock trespasses will be corrected in a timely manner.

After streambank stabilization and channel-floodplain restoration measures are implemented, monitoring will be conducted annually to determine the lengths of non-vegetated, eroding banks at each site where the river banks are unstable. A simple pacing method, such as the 'greenline' method (Winward 2000), will be used to measure the lengths of non-vegetated segments at the edge of the natural channel.

At each river bank restoration site, permanent monitoring segment beginning and end points will be established. At streambank stabilization sites, only one side of the channel will require monitoring. At the channel-floodplain restoration site, the entire length of the river banks on both sides of the channel will require monitoring. Each year, the length of eroding bank at each

site will be reported. If the length of eroding bank at a site is observed to be increasing for a period of two consecutive years, or should a major flood event cause substantial bank erosion to occur, then corrective maintenance actions (discussed below) will be taken.

The condition of the riparian plant communities will be monitored with the use of belt transects. Reclamation attempted to coordinate with the Colorado Native Plant Society (CNPS) regarding the development of methods to measure the vegetation and establish transects suitable to the MA project. However, due to time constraints, the CNPS was unable to address the issue. Therefore, Reclamation drew upon staff expertise and recommendations from private consultants to determine appropriate methodologies to employ. A detailed description of the methodologies being used by Reclamation to monitor the wetland/riparian area is included in Appendix F.

The primary use of the belt transects will be to track plant community species composition in the MA to determine the presence of noxious weeds and other undesirable plant species and to measure the cover of vegetation in the tree, shrub, and herbaceous layers. The number and extent of permanent transects, as well as the baseline measurements of vegetation, were established in 2002, prior to the initiation of vegetation management activities. These belt transects will be used to monitor mitigation success criteria during the mitigation program. Vegetation transect measurements shall be completed annually in July-August time period with the overall condition of the Wetland/Riparian and buffer zones checked on a monthly basis.

Monitoring will also include photo documentation of habitat conditions along the belt transects and at pre-established monitoring points independent of the transects.

An annual monitoring report will be prepared by Reclamation and distributed to the participating agencies by December 31 of the monitoring year. Included in the annual report will be:

- Summary report of progress made and condition of the MA, to include adaptive management actions.
- Weed management actions taken during the year in both the wetland/riparian and buffer zones.
- Details of new plantings and/or replanting of desired vegetation.
- Fence conditions, any fencing actions taken and any noted livestock trespass.
- Summary of hydrology for the year.
- Vegetation monitoring results and inclusion of transect data.
- Monitoring data on streambank stabilization.
- Photos documenting restoration and/or problem areas.
- Monitoring data as needed.

Annual review of progress by regulatory agencies is encouraged.

4.2.2 Hydrologic Conditions

Reclamation will monitor the flows of the La Plata River for the life of the ALP Project to ensure the availability of the necessary hydrology for the maintenance of the mitigation program including use of Reclamation's water rights and the existing natural flows to which Reclamation does not claim any entitlement. Immediately north of the MA, a new ramp flume gauge was installed in 2001 by the LPWCD. Additionally, gauges were installed by Reclamation (Spring 2002) in the La Plata River immediately above and below the confluence with Long Hollow and approximately half way between the confluence of Cherry Creek with the La Plata River and the confluence of Long Hollow with the La Plata River. These flow data gauges will provide a basis for assessing the possible future need to augment the hydrology through the MA.

The Hesperus and state line USGS gauging stations will continue to provide additional data for the basin as a whole and will allow a comparison of hydrologic condition changes through the MA versus overall hydrologic changes in the La Plata River basin. Monitoring wells may also be installed if they are deemed necessary to the mitigation monitoring effort.

Because of the fluctuating nature of the La Plata River system, the specific volume of water necessary for the success of the MA is impossible to determine. The volume of water in the river is highly variable from year to year and from season to season. Reclamation will rely heavily upon the status of the vegetation to determine whether the mitigation is effective or not. The present riparian vegetative community in the MA has developed with the existing hydrology. There is a substantial amount of time when the La Plata River is dry just above the MA. A large amount of the riparian vegetation is dependent upon seeps and springs that feed the river within the MA. Sufficient data are not available on how much flow these springs provide to the MA. Reclamation does not have sufficient hydrology data within the MA to quantify what will be required for the maintenance of riparian vegetation in the MA. The monitoring of the MA will therefore be a combination of both vegetative and hydrologic measurement.

Reclamation will continue to monitor water use activities within the La Plata River basin. Water surface elevations and groundwater influence information for the recent history of the flows through the MA are recorded in the 1995 "Technical Report, Groundwater Summary of the Animas, La Plata and Mancos Rivers" by the Bureau of Reclamation. This data, as well as the multi-year data from gauging stations currently installed on the La Plata River, both within and adjacent to the MA, will provide an indication of pre-mitigation ALP Project wetland/riparian mitigation baseline hydrologic conditions as well as change over time.

4.3 Monitoring Schedule

The condition of the fencing and the occurrence of livestock trespass will be monitored during the routine maintenance of the MA. Monitoring will occur at least on a monthly basis. The streambank stabilization and channel-floodplain restoration sites will be monitored annually for a 5-year period. Monitoring of the streambank stabilization will be extended if Reclamation feels that the possibility exists for de-stabilization to occur again, or if flood waters have damaged bank lines to the point of potential de-stabilization. Additionally, if vegetative

recovery at the sites has not matured to the point of providing increased stability, the sites will be monitored until stability is reached. Monitoring will take place during low-flow conditions in the fall, after the end of the summer field season (approximately October 1).

Yearly plant community monitoring will be conducted yearly through the time when Ridges Basin is being filled and for a 5-year period after reservoir filling. This level of monitoring will be extended if determined necessary. The permanent monitoring transects and photo points will be revisited annually in the July-August period until mitigation success is achieved. The intensive annual monitoring regime will be extended if catastrophic events, such as floods or fires, negatively impact the vegetative community, or if the MA is experiencing significant changes in vegetation community dynamics which may negatively impact Reclamation's mitigation objectives. Additionally, if Reclamation has not yet reached these vegetative goals by the end of the five-year period, Reclamation shall continue monitoring. Otherwise after the five-year period Reclamation shall convert monitoring to once every three to five years. Conversely, should Reclamation reach their vegetative goals earlier than expected, a once every three to five year regime of monitoring shall be adopted.

4.4 Responsible Parties

Reclamation will oversee the implementation of the monitoring plan for the MA.